

Chauhanotrema spiniacetabulum sp. n. (Digenea: Waretrematidae) from *Hemiramphus marginatus* (Forsskal) (Hemiramphidae) from the Kuwaiti Coast of the Arabian Gulf

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ABSTRACT: *Chauhanotrema spiniacetabulum* sp. n. from the intestine of *Hemiramphus marginatus* is described. It differs from *C. indica* Zukov, 1972, the only other species in the genus, by having a shorter esophagus and consequently an intestinal bifurcation near the anterior level of the ventral sucker instead of the posterior level. *Chauhanotrema* (Waretrematidae: Chauhanotrematinae) is characterized by a spiny cuticle, a ventral sucker lined with spines, two caeca extending to testicular level, a single testis, large vitelline follicles, a pretesticular globular ovary, presence of a true seminal receptacle, and absence of a cirrus sac.

KEY WORDS: digenetic trematodes, Waretrematidae, Waretrematinae, *Chauhanotrema*, *Hemiramphus marginatus*, marine fishes, Arabian Gulf, Kuwait.

During the course of a survey of helminth parasites of Kuwaiti coast fishes carried out by the second author between October 1992 and December 1996, 3 blackedge white-banded half-beaks, *Hemiramphus marginatus*, were found harboring a large number of digeneans. These worms are believed to represent a new species.

Materials and Methods

The fish were obtained from the local fish market. Following necropsy, the worms were washed in saline, fixed in cold AFA under slight coverglass pressure, stored in 70% ethanol, stained with alum- or acetocarmine, destained in diluted HCl, dehydrated in ascending concentrations of ethanol, cleared in methylsalicylate or clove oil, and mounted in Canada balsam. Specimens for scanning electron microscope (SEM) examination were dried, using the critical point technique, and coated with gold-palladium; the ventral sucker was observed and photographed using a JEOL, JSM-6300 SEM. Drawings of Figures 1–3 were made by microprojection and details filled in through microscopic examination; details of internal anatomy and male and female terminal reproductive structures are

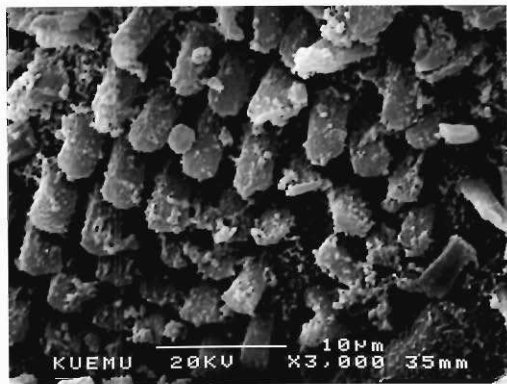
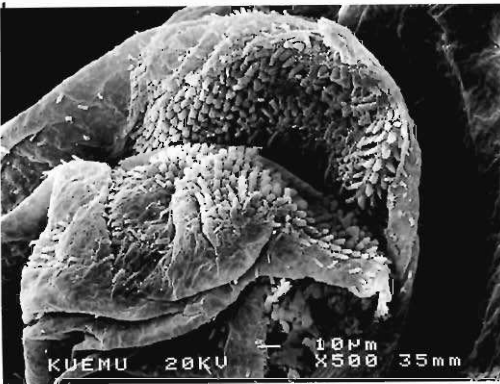
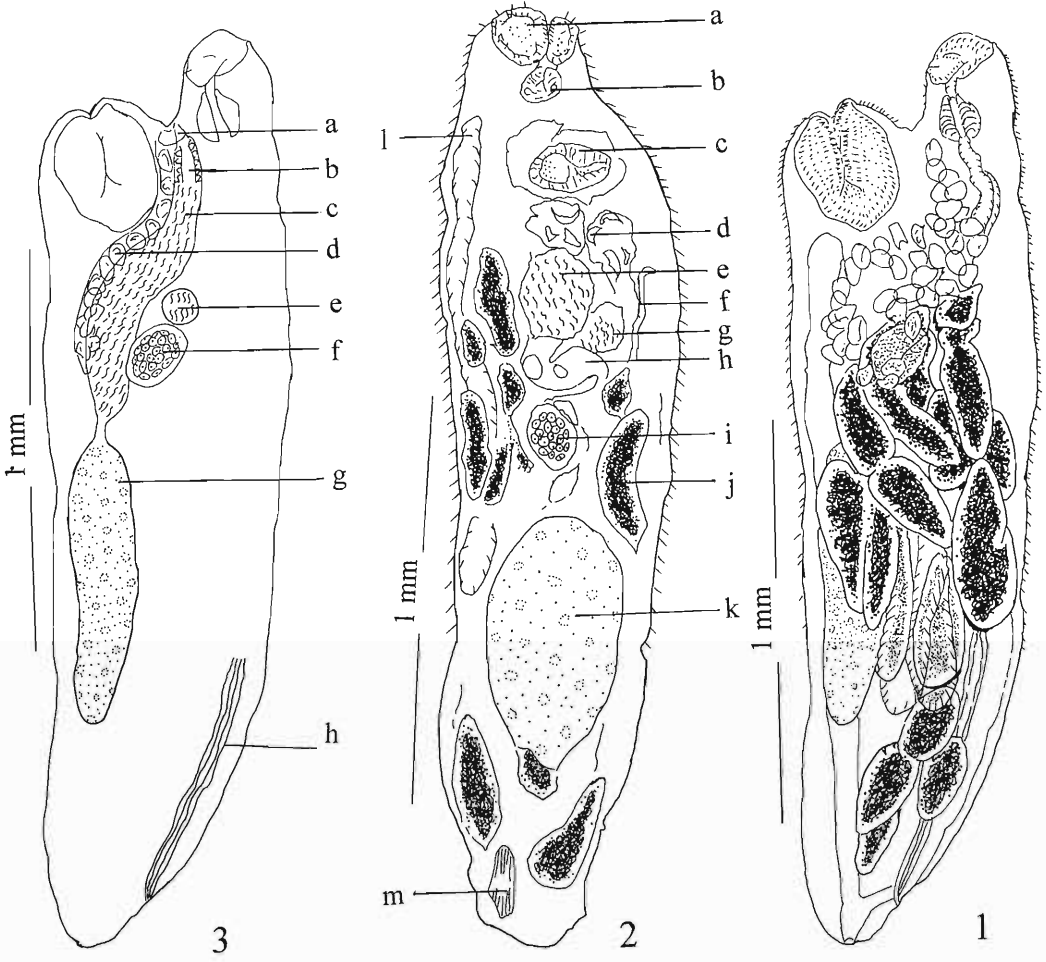
based on 5 sectioned specimens stained with Delafield's hematoxylin and eosin. Measurements are in micrometers, given as range with mean in parentheses. Sucker ratio was calculated from the average of the length plus width (depth) and expressed with the oral sucker as 1. The holotype is deposited in the United States National Parasite Collection (USNPC), Beltsville, Maryland; and paratypes in the National Reference Collection (NRC), Department of Zoology, Kuwait University, Kuwait; the Natural History Museum BM(NH), London; and the Harold W. Manter Laboratory (HWML), Nebraska State Museum, Lincoln.

Chauhanotrema spiniacetabulum sp. n. (Figs. 1–5)

DESCRIPTION (based on 26 mature worms, 5 sectioned specimens, and SEM micrographs): Body elongate to plump, 1180–2500 (1794) long, 325–625 (475) wide just posterior to ventral sucker. Tegument spinose, spines needle-like, 4–6 in length, extending to midlevel of testis. Eye spot pigments dispersed laterally in the pharyngeal area. Oral sucker terminal, 75–155 (98) long, 87–163 (130) wide; prepharynx short, about half pharyngeal length; pharynx 55–100 (75) long by 52–100 (76) wide; esophagus 50–125 (75), about same length as pharynx in well-extended specimens; intestinal bifurcation anterior to ventral sucker; caeca 2, narrow anteriorly, relatively wide posteriorly,

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Figures 1–5. *Chauhanotrema spiniacetabulum* sp. n., holotype from *Hemiramphus marginatus*, ventro-lateral view. 2. Tracing of an actual frontal section from a paratype: a. Oral sucker. b. Pharynx. c. Ventral sucker. d. Egg. e. Midsection of seminal vesicle. f. Laurer's canal. g. Seminal receptacle. h. Oviduct. i. Ovary. j. Vitelline follicle. k. Testis. l. Anterior segment of right caecum. m. Unidentified tubular structure. 3. Composite sketch from serial sections, male and female reproductive organs: a. Genital atrium. b. Pars prostatica. c. Seminal vesicle. d. Uterus. e. Seminal receptacle. f. Ovary. g. Testis. h. Unidentified tubular structure. 4. SEM photograph of ventral sucker showing acetabular spines, ×500 magnification. 5. Same as Figure 4, acetabular spines, ×3000 magnification.



extending to near posterior level of testis. Ventral sucker in anterior fifth of body, 140–270 (202) long by 180–300 (244) deep; its opening lined with 8–10 rows of spines (Fig. 4), each spine 6–8 long, somewhat flattened (Fig. 5). Sucker ratio 1:1.7–2.6 (1:2.2). Testis single, elongate, 400–750 (575) long by 200–300 (237) wide, approximately one third body length, mostly in upper posterior half of body; cirrus sac absent; vas deferens short; seminal vesicle long and wide, straight or sigmoid, approximately same length as testis, extending to anterior level of ventral sucker; pars prostatica cylindrical, short, surrounded by few cells, terminating by short muscular cirrus. Ovary globular, anterodorsal to testis, 138–200 (169) long, 163–180 (172) wide; Mehlis' gland and ootype lateral to ovary; seminal receptacle preovarian, adjacent to the base of the seminal vesicle; Laurer's canal present, near seminal receptacle, opening dorsally in anterior body third; uterus preovarian; metraterm weakly developed. Vitellaria 15–18 large, ovoid-to-elongate follicles of different sizes, 198–465 long by 100–150 wide, many larger than ovary, extending from near posterior level of ventral sucker to, but not reaching, posterior end of body. Eggs operculated, 62–70 by 42–50. Genital atrium small, thin-walled; pore median, between pharynx and ventral sucker. Excretory vesicle sac-like, small, excretory canals extending to near posterior level of ventral sucker.

Taxonomic summary

TYPE HOST: *Hemiramphus marginatus* (Forsskal, 1775) (Hemiramphidae).

SITE IN HOST: Intestine.

DATES OF COLLECTION: 15 October 1993 (6 in 1), 30 November 1996 (5 and 26 in 2).

PREVALENCE: 33.3% (3 of 9).

MEAN INTENSITY: 12.3 worms per host.

TYPE LOCALITY: Kuwaiti coast, Arabian Gulf.

HOLOTYPE: USNPC 87161.

PARATYPES: NRC 15, BM(NH) 1997.5.12.1–2, HWML 39355.

ETYMOLOGY: The species name reflects the worm's spiny ventral sucker.

REMARKS: *Chauhanotrema spiniacetabulum* is very similar to *C. indica* Zhukov, 1972, from *Hemiramphus far* (Forsskal) from India; this is evident in their shape, size, and measurements of most organs; it differs chiefly in having a shorter esophagus that extends to near anterior level of the ventral sucker and consequently more anterior location of the intestinal bifurcation. Zhukov (1972, p. 349) described the intestinal bifurcation "a little behind the lower edge of the ventral sucker" and the "gut-caeca, 0.49–0.58, as short, sac-like, lying in the middle of the body." In *C. spiniacetabulum*, the caeca are tubular. Zhukov's description of the ventral sucker is not very clear. He used the term "spines" to describe the tegument of *C. indica* but did not use the same term to describe the ventral sucker; his description is best translated as having a "fringe." Our description of the internal anatomy is based not only on observations made on whole mounts but also on 5 sets of serial sections, and our description of the ventral sucker, on SEM micrographs. The spines of the ventral sucker are about the same size as those of the

tegument except for a wider base. The SEM micrographs show several layers of spines (Figs. 4, 5), each having a flat rather than pointed tip. The presence or absence of a seminal receptacle in *Chauhanotrema* needs to be resolved; a seminal receptacle was not reported for *C. indica* and is not clearly evident in whole mounts of *C. spiniacetabulum*; some sperm are seen adjacent to the ovary, but whether the structure is a canalicular (true) or a uterine seminal receptacle could not be determined with certainty; several serial sections, however, suggest the presence of a distinct globular structure adjacent to the midsection of but independent of the seminal vesicle, with a tube (Fig. 2) leading toward the oviduct. If Zhukov's species lacks a canalicular seminal receptacle, then *C. spiniacetabulum* should be reassigned to a new genus and, perhaps, a new subfamily. Since Zhukov's description is based on whole mounts, and considering the difficulty we encountered in determining its presence in whole mounts, we prefer not to name a new genus.

Six specimens, slightly smaller than the others, collected 15 October 1993, are not included in measurements because of their poor condition; most of the tegumental spines and the acetabular spines were lost. In several specimens from the other hosts, the anterior part of the seminal vesicle was half as wide as shown in Figure 2. A thick-walled tubular structure (Figs. 1–3) terminating on the dorsal side near the posterior end of the body is seen in many whole mounts and serial sections, but its anterior origin could not be determined with certainty; it seems to originate behind the vitellaria, near the midlevel of the testis; it is not a Laurer's canal; its function is unknown. Such a structure was not described by Zhukov.

Discussion

The new species is placed in the genus *Chauhanotrema* on the basis of its similarity to *C. indica* Zhukov, 1972, from a related host, *Hemiramphus far* (Forsskal). The chief characteristics of *Chauhanotrema* are a spiny ventral sucker with rows of spines lining its opening, a single testis, and very large vitelline follicles, features that, in combination, do not fit into any known family described in Yamaguti (1971). *Chauhanotrema* bears a superficial resemblance to members of Haplospilachnidae Poche, 1926, especially in the presence of single testis (*Prohaplospilachnus diorchis* Tang and Lin, 1978, is the only exception) and the structure of the terminal reproductive organs. Traditionally, the ventral sucker has never been accorded more than a generic significance. However, other characteristics—the spiny ventral sucker, presence of 2 caeca, and a spiny tegument—rule it out, unless the family Haplospilachnidae is drastically revised. (For a review of Family Haplospilachnidae see Nahhas et al., 1997). Zhukov (1972)

placed the genus in Family Waretrematidae and subfamily Chauhanotrematinae.

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Erratum

An error was made in Table 1 for ages of owls in the article by S. J. Taft et al., 1997. Hematozoa of Spring- and Fall-Migrating Northern Saw-Whet Owls (*Aegolius acadicus*) in Wisconsin. *J. Helminthol. Soc. Washington* 64:296–298. The ages should read as follows: <1 Yr. 1 Yr. 2 Yr. ≥3 Yr.